APPENDIX F

MAJOR EQUIPMENT LIST

F.1 INTRODUCTION

The following equipment descriptions are based on conceptual design and are representative of the proposed scope.

F.2 COMBUSTION TURBINE GENERATOR (CTG)

Quantity	Capacity	Description
2	100%	General Electric Model PG7241FA combustion (gas) turbine generator, suitable for firing natural gas, nominally rated at 171.7 MW at ISO conditions. CTG output will increase with steam injection to peak load of 183.4 MW at ISO conditions. A dry-low NO_x combustor is used to control NO_x.
2	100%	Evaporative cooler.
2	100%	Closed-cooling-water-to-air heat exchanger (fin-fan cooler).
2	100%	Hydrogen cooled generator.
2	100%	Compressor water wash system (on/off-line).
2	100%	Acoustical enclosure.
2	100%	CO_2 or FM-200 fire protection system.

F.3 HEAT RECOVERY STEAM GENERATOR (HRSG)

Quantity	Capacity	Description
2	100%	HRSG - sliding-pressure, supplemental fired, triple-pressure reheat type steam generator design with vertical gas path
2	100%	Selective catalytic reduction (SCR) system with aqueous ammonia injection.
2	100%	Oxidation catalyst for control of carbon monoxide (CO).
1	100%	Aqueous ammonia storage tank (existing 20,000 gal.).
2	100%	HRSG inlet/outlet ducts and exhaust stack.

F.4 STEAM TURBINE GENERATOR (STG)

Quantity	Capacity	Description
1	100%	General Electric reheat, double flow, down exhausting condensing-extraction type reheat steam turbine generator with nominal throttle conditions of 1,815 psia, 1050^{o}F, and 1050^{o}F reheat temperature. Peak generating output of 280 MW with throttle at 5% overpressure condition of 1905 psia. The STG has the following accessories: • Lube oil system. • Hydraulic oil system. • Steam seal and exhauster system. • Turbine control system. • Hydrogen cooling system. • Seal oil system. • Steam stop/control valves.

F.5 FEEDWATER SYSTEM

Quantity	Capacity	Description
4	100%	HP/IP HRSG feedwater pumps. • HP rated flow - 1,670 gpm. • IP rated flow - 250 gpm.

F.6 HEAT REJECTION SYSTEM

Quantity	Capacity	Description
1	100%	Two-pass, steam surface condenser with titanium tubes and vacuum deaeration.
2	100%	Condensate pump - 3,700 gpm.
1	100%	Once-through cooling water system utilizing seawater from Santa Monica Bay (existing system).
4	25%	Circulating water pump - 36,000 gpm (existing).
1	100%	Condenser air removal system (either two mechanical vacuum pumps or single steam jet air ejector system).

F.7 COMPRESSED AIR SYSTEM

Quantity	Capacity	Description
2	100%	Air compressors - air-cooled.
1	100%	Air receiver tank.
2	100%	Air dryers.

F.8 WATER TREATMENT SYSTEM

Quantity	Capacity	Description
1	100%	Portable cycle makeup demineralizer system (trailer mounted with offsite regeneration) - 300 gpm.
1	100%	Fire/service water storage tank - 450,000 gal.
1	100%	Demineralized water tank - 300,000 gal.
1	100%	Condensate storage tank - 300,000 gal.
2	100%	Oil/water separators with duplex pumps.
--	--	Miscellaneous chemical storage vessels, injection packages for treatment of circulating water and feedwater.

F.9 FUEL SYSTEM

Quantity	Capacity	Description
1	100%	Metering station.
3	50%	Gas compressors
2	100%	Fuel gas scrubber/filter.

F.10 FIRE PUMPS

Quantity	Capacity	Description
1	100%	2,500 gpm electric motor-driven fire pump.
1	100%	2,500 gpm diesel engine-driven fire pump.
1	100%	Electric motor-driven jockey pump (pressure maintenance).

F.11 ELECTRICAL EQUIPMENT

Quantity	Capacity	Description
1	100%	ST Generator step-up transformer 300 MVA, OA/FA/FA, 230 kV - 18 kV.
2	100%	CT Generator step-up transformer 200 MVA, OA/FA/FA, 230 kV - 18 kV.
2	100%	Unit auxiliary transformer 20 MVA, OA/FA, 18 kV - 4.16 kV.
1	100%	ST Generator circuit breaker 11,000 amp, 24 kV.
2	100%	CT Generator circuit breaker 7,000 amp, 24 kV.
2	100%	Electrical equipment module including 4.16 kV switchgear, 480 V load centers and MCCs.

MAJOR EQUIPMENT LIST

Quantity	Description	Size/Capacity[1]	Remarks
2	CT generator	171.7 MW	Dry low NOx combustion control and starter package
1	Steam turbine	280 MW	Reheat condensing-extraction type
1	ST generator	373 MVA	Hydrogen cooling system
2	CT inlet housing	743,268 CFM	
2	Inlet air cooling		Evaporative type
2	Fuel gas filter--separator	75,850 lb/h	450 psig minimum inlet pressure
2	Heat recovery steam generator (HRSG) @ 1905 psia (5% OP)	827,011 lb/h	Sliding-pressure, supplemental fired, triple-pressure reheat type
2	HRSG stack		18'-6" dia.; outlet at 250 feet AFG
2	CO catalyst		
2	Selective catalytic reduction (SCR)		
2	Aqueous ammonia injection skid		Two blowers per HRSG
1	Aqueous ammonia storage tank	20,000 gal	Existing
4	HP/IP HRSG feedwater pumps	1,670 gpm/250 gpm	HP with interstage bleed
1	Fire/service water storage tank	450,000 gal	
1	Demineralized water treatment package	300 gpm	Portable trailer mounted, off-site regeneration
1	Demineralized water storage tank	300,000 gal	
1	Condensate storage tank	300,000 gal	
1	Steam surface condenser	1,283 MBtu/h	
2	Condensate pumps	3,700 gpm	
4	Circulating water pumps	36,000 gpm	Existing
1	Fire water - electric motor	2,500 gpm	
1	Fire water - diesel engine	2,500 gpm	
2	Oily water separators		
3[2]	Step-up transformers	18/230 kV	To electrical grid

[1]Size/capacity is for each piece of equipment.
[2]As indicated on previous page in Section F.11.

SIGNIFICANT STRUCTURES AND EQUIPMENT

Quantity	Description	Dimension (ft)		
		Length	Width	Height
2	Combustion gas turbine with starter package	50	45	20
2	CT air inlet filter with air cooling	57	20	57
2	CT generator with enclosure	40	20	25
2	Fuel gas filter - separator	10	10	40
2	Heat recovery steam generator (HRSG)	130	45	95
2	HRSG stack	--	18.5 dia	250 AFG
2	Aqueous ammonia vaporizer skid (SCR)	20	15	10
2	CT generator breakers	20	15	15
1	Steam turbine pedestal w/turbine and condenser	193	96	40
2	Auxiliary transformer	15	10	20
3	Step-up transformer	35	20	25
2	Secondary unit substation / transformer	28	20	15
1	Demineralized Water Storage Tank	--	40 dia	36
1	Fire/Service Water Storage Tank	--	44 dia	40
1	Condensate Storage Tank	--	40 dia	36
1	Aqueous ammonia storage tank (existing)	--	--	--
1	Administration / Maintenance building	120	60	54
1	Fire pump structure	30	15	12
2	Electrical/control center	36	12	15